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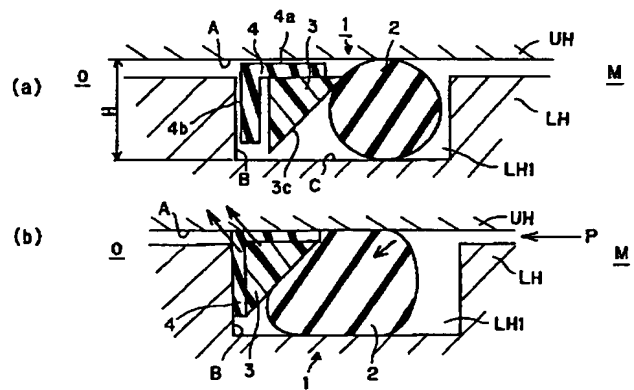
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(54) 【発明の名称】 密封装置

(57) 【要約】

【課題】 透過性の高いガスを長期にわたって良好に密封可能とする密封装置を提供する。

【解決手段】 溝底面C及び密接面Aに密接するゴム状弾性部材2と、ゴム状弾性部材2の大気側領域O側に設けられ、ゴム状弾性部材2に押圧される傾斜面3cを有する樹脂部材3と、樹脂部材3の大気側領域O側に設けられ、樹脂部材3に押圧されて側壁面B及び密接面Aに密接するゴム状弾性部材4と、を備える。



【特許請求の範囲】

【請求項 1】環状隙間を形成する 2 対向面のいずれか一方の面に形成された環状溝に配置されて、該環状隙間のガス漏れを封止する密封装置において、

前記環状溝の溝底部及び他方の面に密接する第 1 のゴム状弾性部材と、

前記第 1 のゴム状弾性部材の反密封側に設けられ、該第 1 のゴム状弾性部材に押圧される傾斜面を有する樹脂部材と、

前記樹脂部材の反密封側に設けられ、該樹脂部材に押圧されて前記環状溝の反密封側の側壁面及び前記他方の面に密接する第 2 のゴム状弾性部材と、
を備えることを特徴とする密封装置。

【請求項 2】前記第 2 のゴム状弾性部材は、前記他方の面に密接する円筒状部と、前記円筒状部の反密封側の端部から前記溝底部に向かって延出するとともに、前記樹脂部材に押圧されて前記側壁面に密接する径方向部と、
を備えることを特徴とする請求項 1 に記載の密封装置。

【請求項 3】前記樹脂部材は、前記側壁面及び前記他方の面に密接する密接部をそれぞれ備えることを特徴とする請求項 1 または 2 に記載の密封装置。

【請求項 4】前記第 1 のゴム状弾性部材は、前記溝底部に設けられる傾斜面に配置されることを特徴とする請求項 1、2 または 3 に記載の密封装置。

【発明の詳細な説明】

【0 0 0 1】

【発明の属する技術分野】本発明は、ガスを密封可能とする密封装置に関するものである。

【0 0 0 2】

【従来の技術】従来、この種の密封装置としては、例えばカーエアコンシステムに適用されているが、ここで、カーエアコンシステムにおいてコンプレッサー等を使用される冷却媒体として、従来よりフロン系の冷却媒体が使用されている。

【0 0 0 3】しかしながら、オゾン層破壊の原因となる C F C (クロロフルオロカーボン) は既に使用禁止となり、現在代替されている H C F C (ハイドロクロロフルオロカーボン、R 2 2 等) も、全面使用禁止となることが予定されている。

【0 0 0 4】そして、これらフロン系の冷却媒体は H F C (ハイドロフルオロカーボン、R 1 3 4 等) に移行されてきている。

【0 0 0 5】しかし、H F C はオゾン層の破壊には影響しないが、地球温暖化の要因となることが指摘されており、現在ではオゾン層の破壊や地球温暖化の影響が小さい脱フロン化冷却媒体として、C O₂ が有力な候補となっている。

【0 0 0 6】

【発明が解決しようとする課題】しかしながら、C O₂

を冷却媒体として利用する装置には、従来と同様の密封装置が使用不可能であるという問題がある。

【0 0 0 7】これは、例えば C O₂ を機器内部で圧縮する際に、原理的には従来の冷却媒体の代わりに C O₂ を使用することになるので、メカニカルな機構としては同様のものが使用可能であっても、従来のいわゆるシールやパッキン等の密封装置が、C O₂ を安定して密封することができず、機器の機能を効果的に発揮させることができない問題である。

【0 0 0 8】確実なシールを求める場合、隙間をゼロとするために、接触式のシール部品が用いられ、従来品の代表としては O リング等がある。これらは、ゴム単素材料品なので、ある種のガスに対し既存のゴム材料が、耐透過性・耐膨潤性・耐ブリストタ性の全てを同時に満足するものは無く、従って、シール部品単品では、満足できるシールが成立しない。

【0 0 0 9】また、樹脂等のゴム (十分な弾性を有する材料) でない部材には、耐透過性・耐膨潤性・耐ブリストタ性の全てを同時に満足するものは有るが、十分なシールを確保する程の接触が得られない (僅かながら、隙間が生じてしまう)。このような場合に生じる隙間漏れ量は、概ね O リングのガス透過量より大きいものである。

【0 0 1 0】本発明は上記の従来技術の課題を解決するためになされたもので、その目的とするところは、透過性の高いガスを長期にわたって良好に密封可能とする密封装置を提供することにある。

【0 0 1 1】

【課題を解決するための手段】上記目的を達成するために本発明にあっては、環状隙間を形成する 2 対向面のいずれか一方の面に形成された環状溝に配置されて、該環状隙間のガス漏れを封止する密封装置において、前記環状溝の溝底部及び他方の面に密接する第 1 のゴム状弾性部材と、前記第 1 のゴム状弾性部材の反密封側に設けられ、該第 1 のゴム状弾性部材に押圧される傾斜面を有する樹脂部材と、前記樹脂部材の反密封側に設けられ、該樹脂部材に押圧されて前記環状溝の反密封側の側壁面及び前記他方の面に密接する第 2 のゴム状弾性部材と、を備えることを特徴とする。

【0 0 1 2】このように構成することにより、前記第 1 のゴム状弾性部材により環状隙間を定常的に密封することができ、該第 1 のゴム状弾性部材を透過してしまうガスに対しては前記樹脂部材により密封することができ、さらに、前記第 2 のゴム状弾性部材により該樹脂部材の隙間漏れを封止することが可能となる。加圧時には、該第 2 のゴム状弾性部材は、該第 1 のゴム状弾性部材により該樹脂部材を介して前記側壁面及び前記他方の面に密接するので、密封性能を向上させることができる。

【0 0 1 3】また、前記第 2 のゴム状弾性部材は、前記他方の面に密接する円筒状部と、前記円筒状部の反密封側の端部から前記溝底部に向かって延出するとともに、

前記樹脂部材に押圧されて前記側壁面に密接する径方向部と、を備えることも好適である。

【0014】このように構成することにより、第2のゴム状弾性部材は、ガスが透過する透過経路に対して、断面積を小さく、透過経路の距離を大きくする形状をとることができるので、ガスの透過量を抑えることができる。

【0015】また、前記樹脂部材は、前記側壁面及び前記他方の面に密接する密接部をそれぞれ備えることも好適である。

【0016】このように構成することにより、前記樹脂部材からの隙間漏れを極力抑えることが可能となる。

【0017】また、前記第1のゴム状弾性部材は、前記溝底部に設けられる傾斜面に配置されることも好適である。

【0018】このように構成することにより、前記樹脂部材の厚さを保持し、かつ、該樹脂部材及び前記第2のゴム状弾性部材を前記側壁面及び前記他方の面の方向に押圧することができる。

【0019】

【発明の実施の形態】以下に図面を参照して、この発明の好適な実施の形態を例示的に詳しく説明する。ただし、この実施の形態に記載されている構成部品の寸法、材質、形状それらの相対配置などは、発明が適用される装置の構成や各種条件により適宜変更されるべきものであり、この発明の範囲を以下の実施の形態に限定する趣旨のものではない。

【0020】図1、2を用いて本発明の実施の形態に係る密封装置1について説明する。ここで、2対向面により形成される環状隙間は、相対移動を行う、例えば回転軸や往復動軸とハウジングとにより形成されるものでもよく、また、相対移動を行わない、例えばハウジング間に形成されるものでもよい。本実施の形態では、密封装置1がハウジング間に設けられた場合について説明する。

【0021】図1は本発明を適用した密封装置を説明する図であり、図1(a)は密封容器の上ハウジングUHと下ハウジングLHとの環状隙間に備えられる密封装置1の概略断面図であり、図1(b)は膜材料を透過し易いガス(例えば、CO₂)を封じ込めてシール機能を発揮させている状態である。

【0022】すなわち、本実施の形態に係る密封装置1は、一方の面としての下ハウジングLHに形成された環状溝としての溝LH1に嵌め合わされ、他方の面としての上ハウジングUHの密接面Aと下ハウジングLHの溝LH1の溝底面Cに密接することにより、反密封側である大気側領域Oに対して密封側領域Mに封入されたCO₂をシールしている。

【0023】密封装置1は、CO₂に対して、耐ガス透過性が良く、膨潤が少なく、プリスタしない第1及び第

2のゴム状弾性部材としてのゴム状弾性部材2、4及び樹脂部材3から構成されている。しかしながら、ゴム状弾性部材2においては、これらの要素全てを満たすことは難しく、膨潤が少なく、プリスタしないことを優先している。

【0024】ここで、ゴム状弾性部材2には、VMQ、ゴム状弾性部材4には、IIR、HNBR、または、FKM、樹脂部材3には、ナイロン系材料を選定すると好適である。

10 【0025】また、密封装置1は、密封側領域M側から順にゴム状弾性部材2、樹脂部材3、ゴム状弾性部材4を備えている。

【0026】ゴム状弾性部材2は、リングであると好ましく、密接面A及び溝底面Cに密接している。ゴム状弾性部材2には、組み込み初期状態において、適度なつぶしが与えられている。

20 【0027】樹脂部材3は、ゴム状弾性部材2の大気側領域O側に設けられ、傾斜面3cを備えている。傾斜面3cは、ゴム状弾性部材2に押圧されると、密接面A、及び溝LH1の大気側領域O側の側壁面Bの方向に分力を発生する。

30 【0028】ゴム状弾性部材4は樹脂部材3の大気側領域O側に設けられ、密接面Aに密接する円筒状部4aと、円筒状部4aの大気側領域O側の端部から溝底面Cに向かって延出する径方向部4bと、から構成される。ゴム状弾性部材4は、樹脂部材3により密接面A及び側壁面Bの方向に押圧されると、円筒状部4aは密接面Aに押し付けられ、径方向部4bは側壁面Bに押し付けられる。樹脂部材3とゴム状弾性部材4との組み合わせにおいて、つぶしを与えても与えなくても良く、本実施の形態では溝LH1の深さHと同等としている。

【0029】そして、加圧時には図1(b)に示す状態となる。すなわち、密封側領域Mからの圧Pにより、大気側領域O側に押し付けられたゴム状弾性部材2は、樹脂部材3の傾斜面3cに沿って、図中の矢印方向に潜り込んで行く。ゴム状弾性部材2が傾斜面3cに沿って潜り込むことにより、樹脂部材3は、密接面A及び側壁面Bの方向に押し上げられる。樹脂部材3が押し上げられることにより、ゴム状弾性部材4は、密接面A及び側壁面Bに押し付けられる。

【0030】このように構成された密封装置1は、図2(a)に示すような状態で使用されるものである。

【0031】本実施の形態では、ゴム状弾性部材2が配置される溝LH1の溝底面Cに傾斜面LH2を設けている。図において、 $\theta 1$ は径方向に対する傾斜面3cの角度であり、 $\theta 2$ は軸方向に対する傾斜面LH2の角度を表わしている。

【0032】ゴム状弾性部材2が、密封側領域Mからの圧Pにより傾斜面LH2及び傾斜面3cに沿って潜り込むことにより、樹脂部材3及びゴム状弾性部材4を所定

の位置（大気側領域○側の環状隙間方向）に移動させて、樹脂部材3とゴム状弾性部材4とを密接させ、ゴム状弾性部材4を密接面A及び側壁面Bに密接させている。

【0033】樹脂部材3及びゴム状弾性部材4を環状隙間方向に移動させるには、 $\theta 1$ と $\theta 2$ との和が 45° となるように、傾斜面LH2及び傾斜面3cを設定することが好ましく、本実施の形態では、 $\theta 1 = 30^\circ$ 、 $\theta 2 = 15^\circ$ としている。

【0034】これにより、ゴム状弾性部材4が略均等に密接面A及び側壁面Bに密接することができ、良好な密封性能を得ることができる。また、溝LH1に傾斜面LH2を設けることにより、傾斜面3cの角度を小さくすることができ、樹脂部材3の厚さを確保することができるので、ガス耐透過性の向上を図ることが可能となる。特に、溝LH1の軸方向の寸法が小さい場合に効果的である。

【0035】樹脂部材3は、ゴム状弾性部材2に押圧されることにより、密接部3a及び3bで密接面A及び側壁面Bを押し付けるとともに、ゴム状弾性部材4に密接してゴム状弾性部材4を密接面A及び側壁面Bの方向に押し付けている。

【0036】ゴム状弾性部材4は、樹脂部材3に押圧されることにより、密接面A及び側壁面Bに押し付けられる。

【0037】初期状態においては、ゴム状弾性部材2は、つぶしが与えられているので、定常的に隙間ゼロとして密接面A及び溝底面Cに密接して環状隙間を密封する。

【0038】ガス透過は、膜となる密封装置の両側に圧力差がある場合に生じるものであり、圧力差がほとんどゼロの場合には、ガス透過は無視できるので隙間漏れを封じればよく、これはゴム状弾性部材2により達成される。

【0039】しかしながら、圧力差がある場合には、ガスがゴム状弾性部材2を透過してしまう場合があり、このような場合に本実施の形態は、密封側領域Mからの加圧状態により、ゴム状弾性部材2、樹脂部材3、ゴム状弾性部材4の組み合わせでセルフシールを発現させるものである。

【0040】すなわち、ゴム状弾性部材2を透過したガスは、樹脂部材3により透過を遮断することができる。そして、樹脂部材3には僅かながら弾性があるため、密接部3a及び3bで密接面A及び側壁面Bを押し付けることにより、隙間漏れを極力抑えることが可能となる。それでも樹脂部材3は隙間漏れを起こす可能性があり、その場合に、ゴム状弾性部材4が密接面A及び側壁面Bに弾性接触していることにより、環状隙間を確実に密封している。

【0041】それに加えて、本実施の形態では、ゴム状

弾性部材4をガス透過量を抑える形状としている。

【0042】ここで、ガスの透過量は、

$$[\text{透過量 } Q] = [\text{透過係数 } K_p] \times [\text{ガスとの接触面積 } S] \times [\text{圧力差 } P] \times [\text{時間 } t] \div [\text{膜厚 } h]$$

で表わされるものであり、従って、「Sを小さく、かつ、hを大きく」することにより、透過量Qを抑えることができる。

【0043】これは、図2(b)に示すように、ゴム状弾性部材4の形状を、ガスの透過経路に対して、断面積(S)を小さく、透過距離(h)が大きくなるような形状とすることによりガス透過量を抑えることができるというものである。

【0044】なお、ゴム状弾性部材2、樹脂部材3、ゴム状弾性部材4は一体化して設けてもよく、また、組み合わせで用いても良い。

【0045】

【発明の効果】以上説明したように、本発明によれば、前記第1のゴム状弾性部材により環状隙間を定常的に密封することができ、該第1のゴム状弾性部材を透過してしまうガスに対しては前記樹脂部材により密封することができ、さらに、前記第2のゴム状弾性部材により該樹脂部材の隙間漏れを封止することが可能となる。加圧時には、該第2のゴム状弾性部材は、該第1のゴム状弾性部材により該樹脂部材を介して前記側壁面及び前記他方の面に密接するので、密封性能を向上させることができる。

【0046】また、前記第2のゴム状弾性部材は、ガスが透過する透過経路に対して、断面積を小さく、透過経路の距離を大きくする形状をとることができるので、ガスの透過量を抑えることができる。

【0047】また、前記樹脂部材は、前記側壁面及び前記他方の面に密接する密接部をそれぞれ備えるので、該樹脂部材からの隙間漏れを極力抑えることが可能となる。

【0048】また、前記第1のゴム状弾性部材は、前記溝底部に設けられた傾斜面に配置されることにより、前記樹脂部材の厚さを保持し、かつ、該樹脂部材及び前記第2のゴム状弾性部材を前記側壁面及び前記他方の面の方向に押圧することができる。

【0049】従って、透過性の高いガスを長期にわたって良好に密封可能とする密封装置を提供することが可能となる。

【図面の簡単な説明】

【図1】図1(a)は実施の形態に係る密封装置を説明する図、同図(b)はシール機能を発揮させている状態を説明する図である。

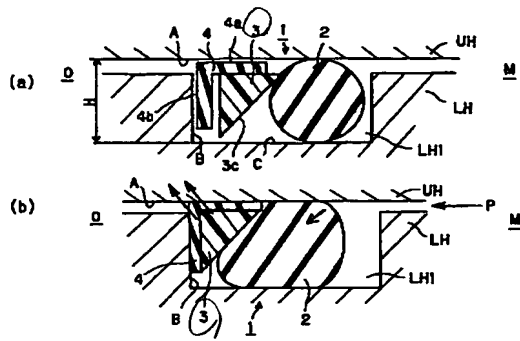
【図2】図2(a)は実施の形態に係る密封装置の概略断面図、同図(b)はガスがゴム状弾性部材を透過する状態を示す模式図である。

【符号の説明】

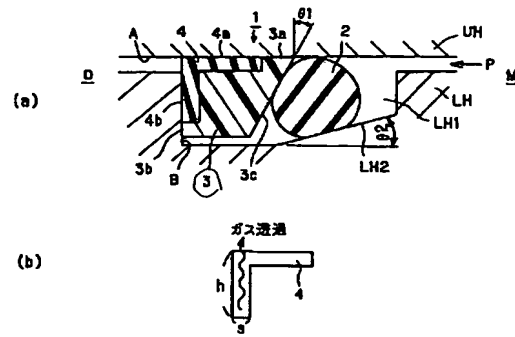
- 1 密封装置
2, 4 ゴム状弾性部材
3 樹脂部材

- 3 a, 3 b 密接部
3 c, L H 2 傾斜面
4 a 円筒状部
4 b 径方向部

【図 1】



【図 2】



フロントページの続き

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PATENT ABSTRACTS OF JAPAN

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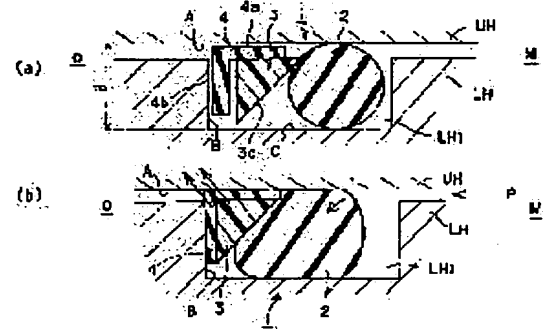
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(54) SEALING DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a sealing device capable of properly sealing a gas of high permeability for a long period.

SOLUTION: This sealing device comprises a rubber elastic member 2 closely abutted on a groove bottom face C and an abutting face A, a resin member 3 mounted at a side of an atmospheric air side area O of the rubber elastic member 2 and having an inclined face 3c to be pressed to the rubber elastic member 2, and a rubber elastic member 4 mounted at a side of the atmospheric air side area O of the resin member 3 and pressed by the resin member 3 to be abutted on a side wall face B and the abutting face A.



LEGAL STATUS

[Date of request for examination]

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CLAIMS

[Claim(s)]

[Claim 1] In the sealing device which is arranged in the circular sulcus formed in one field of two opposed faces which form an annular clearance, and closes the gas leakage of this annular clearance The 1st rubber-like elasticity member close to the groove bottom section of said circular sulcus, and the field of another side, it prepares in the anti-seal side of said 1st rubber-like elasticity member -- having -- this -- with the resin member which has the inclined plane pressed by the 1st rubber-like elasticity member The sealing device characterized by having the 2nd rubber-like elasticity member which is prepared in the anti-seal side of said resin member, is pressed by this resin member, and is close to the side-attachment-wall side by the side of anti-seal of said circular sulcus, and the field of said another side. G

[Claim 2] Said 2nd rubber-like elasticity member is a sealing device according to claim 1 characterized by having the direction section of a path which is pressed by said resin member and is close to said side-attachment-wall side while extending toward said groove bottom section from the cylindrical section close to the field of said another side, and the edge by the side of anti-seal of said cylindrical section.

[Claim 3] Said resin member is a sealing device according to claim 1 or 2 characterized by having the close section close to said side-attachment-wall side and the field of said another side, respectively.

[Claim 4] Said 1st rubber-like elasticity member is a sealing device according to claim 1, 2, or 3 characterized by being arranged in the inclined plane established in said groove bottom section.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the sealing device whose seal of gas is enabled.

[0002]

[Description of the Prior Art] As this kind of a sealing device, although applied, for example to the car air-conditioner system, the cooling medium of a chlorofluorocarbon system is conventionally used here as a cooling medium used for a compressor etc. in a car air-conditioner system.

[0003] However, CFC (chlorofluorocarbon) leading to ozone layer depletion already serves as a disable, and it is planned that HCFC (hydrochlorofluorocarbon, R22 grade) by which the current alternative is carried out also serves as a whole surface disable.

[0004] And the cooling medium of these chlorofluorocarbon system is shifting to HFC (hydro fluorocarbon, R134 grade).

[0005] However, HFC is CO₂ as a dechlorofluorocarbon-ized cooling medium with destruction of an ozone layer and the effect of global warming becoming the factor of global warming is pointed out and small current although destruction of an ozone layer is not influenced. He is a strong candidate.

[0006]

[Problem(s) to be Solved by the Invention] However, CO₂ There is a problem that the same sealing device as usual is unusable in the equipment used as a cooling medium.

[0007] This is CO₂. In case it compresses inside a device, it is CO₂ theoretically instead of the conventional cooling medium. Since it will be used, even if the thing same as a mechanical device is usable, sealing devices, such as the so-called conventional seal and packing, are CO₂. It is the problem which it is stabilized, and it cannot seal [problem] and cannot demonstrate the function of a device effectively.

[0008] When asking for a positive seal, in order to make a clearance into zero, the seal components of a contact process are used and there is an O ring etc. as a representative of elegance conventionally. Since these are rubber single raw material articles, the seal that with which the existing rubber ingredient is simultaneously satisfied of all permeability-proof, the bloating tendency-proof, and blister-proof nature to a certain kind of gas does not have, therefore it can be satisfied with a seal components item of a seal is not materialized.

[0009] Moreover, although there is what satisfies simultaneously all permeability-proof, the bloating tendency-proof, and blister-proof nature in the member which are not rubber (ingredient which has sufficient elasticity), such as resin, contact to the extent that enough seals are secured is not acquired (a clearance will be generated slightly). In such a case, the clearance ullage to produce is larger than the amount of gas transparency of an O ring in general.

[0010] The place which it was made in order that this invention might solve the technical problem of the above-mentioned conventional technique, and is made into the object is to offer the sealing device which enables seal of penetrable high gas good over a long period of time.

[0011]

[Means for Solving the Problem] If it is in this invention in order to attain the above-mentioned

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object In the sealing device which is arranged in the circular sulcus formed in one field of two opposed faces which form an annular clearance, and closes the gas leakage of this annular clearance The 1st rubber-like elasticity member close to the groove bottom section of said circular sulcus, and the field of another side, it prepares in the anti-seal side of said 1st rubber-like elasticity member -- having -- this -- with the resin member which has the inclined plane pressed by the 1st rubber-like elasticity member It is characterized by having the 2nd rubber-like elasticity member which is prepared in the anti-seal side of said resin member, is pressed by this resin member, and is close to the side-attachment-wall side by the side of anti-seal of said circular sulcus, and the field of said another side.

[0012] thus, the thing to constitute -- said 1st rubber-like elasticity member -- an annular clearance -- steady -- it can seal -- this -- to the gas which penetrates the 1st rubber-like elasticity member, it can seal by said resin member, and it becomes still more possible to close the clearance leakage of this resin member by said 2nd rubber-like elasticity member. the time of application of pressure -- this -- the 2nd rubber-like elasticity member -- this -- since it is close to said side-attachment-wall side and the field of said another side through this resin member with the 1st rubber-like elasticity member, sealing ability can be raised.

[0013] Moreover, it is also suitable for it to have the direction section of a path which is pressed by said resin member and is close to said side-attachment-wall side while said 2nd rubber-like elasticity member extends toward said groove bottom section from the cylindrical section close to the field of said another side, and the edge by the side of anti-seal of said cylindrical section.

[0014] Thus, since the 2nd rubber-like elasticity member can take the configuration which is small in the cross section and enlarges distance of a transparency path to the transparency path which gas penetrates by constituting, the amount of transparency of gas can be stopped.

[0015] Moreover, it is also suitable for said resin member to have the close section close to said side-attachment-wall side and the field of said another side, respectively.

[0016] Thus, by constituting, it becomes possible to suppress the clearance leakage from said resin member as much as possible.

[0017] Moreover, it is also suitable for said 1st rubber-like elasticity member to be arranged in the inclined plane established in said groove bottom section.

[0018] Thus, by constituting, the thickness of said resin member can be held and this resin member and said 2nd rubber-like elasticity member can be pressed in the direction of said side-attachment-wall side and the field of said another side.

[0019]

[Embodiment of the Invention] With reference to a drawing, the gestalt of suitable implementation of this invention is explained in detail in instantiation below. however, the dimension of the component part indicated by the gestalt of this operation, construction material, and a configuration -- the relative configuration of them etc. is not the thing of the meaning which should be suitably changed according to the configuration and the various conditions of equipment that invention is applied, and limits the range of this invention to the gestalt of the following operations.

[0020] Drawing 1 and the sealing device 1 applied to the gestalt of operation of this invention using 2 are explained. Here, the annular clearance formed of two opposed faces performs relative displacement, for example, may not be formed with a revolving shaft, a reciprocation shaft, and housing, does not perform relative displacement, and may be formed between housing. The gestalt of this operation explains the case where a sealing device 1 is formed between housing.

[0021] Drawing 1 is drawing explaining the sealing device which applied this invention, drawing 1 (a) is the outline sectional view of the sealing device 1 with which the annular clearance of the hermetic container top housing UH and the bottom housing LH is equipped, and drawing 1 (b) is in the condition of confining the gas (for example, CO₂) which is easy to penetrate a film ingredient, and demonstrating the seal function.

[0022] Namely, the sealing device 1 concerning the gestalt of this operation By being inserted in the slot LH 1 as a circular sulcus formed in the bottom housing LH as one field, and being close to the close side A of the top housing UH as a field of another side, and the groove bottom side C of the slot LH 1 of the bottom housing LH CO₂ enclosed with the seal side field M to the

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atmospheric-air side field O which is an anti-seal side The seal is carried out.

[0023] A sealing device 1 is CO₂. It receives, and it is good, there is little swelling and gas-proof permeability consists of the rubber-like elasticity members 2 and 4 and the resin members 3 as 1st [which does not carry out a blister], and 2nd rubber-like elasticity members. However, in the rubber-like elasticity member 2, it is difficult to fill all these elements, there is little swelling, and priority is given to not carrying out a blister.

[0024] Here, it is suitable if a nylon system ingredient is selected to IIR, HNBR or FKM, and the resin member 3 at the rubber-like elasticity member 2 at VMQ and the rubber-like elasticity member 4.

[0025] Moreover, the sealing device 1 is equipped with the rubber-like elasticity member 2, the resin member 3, and the rubber-like elasticity member 4 sequentially from the seal side field M side.

[0026] The rubber-like elasticity member 2 is desirable in it being an O ring, and close to the close side A and the groove bottom side C. Moderate crushing is given to the rubber-like elasticity member 2 in the inclusion initial state.

[0027] The resin member 3 was formed in the atmospheric-air side field O side of the rubber-like elasticity member 2, and is equipped with inclined plane 3c. If inclined plane 3c is pressed by the rubber-like elasticity member 2, it will generate component of a force in the direction of the close side A and the side-attachment-wall side B by the side of the atmospheric-air side field O of a slot LH 1.

[0028] direction section of path 4b which extends toward the groove bottom side C from the edge by the side of the atmospheric-air side field O of cylindrical section 4a which the rubber-like elasticity member 4 is formed in the atmospheric-air side field O side of the resin member 3, and is close to the close side A, and cylindrical section 4a --- since --- it is constituted. If the rubber-like elasticity member 4 is pressed by the resin member 3 in the direction of the close side A and the side-attachment-wall side B, cylindrical section 4a will be forced on the close side A, and direction section of path 4b will be forced on the side-attachment-wall side B. Even if it gives crushing, it is not necessary to give, and in the combination of the resin member 3 and the rubber-like elasticity member 4, it is supposed with the gestalt of this operation that it is equivalent to depth H of a slot LH 1.

[0029] And at the time of application of pressure, it will be in the condition which shows in drawing 1 (b). Namely, the rubber-like elasticity member 2 forced on the atmospheric-air side field O side by ** P from the seal side field M is hidden in the direction of an arrow head in drawing along with inclined plane 3c of the resin member 3. When the rubber-like elasticity member 2 is hidden along with inclined plane 3c, the resin member 3 is pushed up in the direction of the close side A and the side-attachment-wall side B. The rubber-like elasticity member 4 is forced on the close side A and the side-attachment-wall side B by pushing up the resin member 3.

[0030] Thus, the constituted sealing device 1 is used in the condition that it is shown in drawing 2 (a).

[0031] With the gestalt of this operation, the inclined plane LH 2 is established in the groove bottom side C of the slot LH 1 where the rubber-like elasticity member 2 is arranged. In drawing, theta 1 is the include angle of inclined plane 3c to the direction of a path, and theta 2 expresses the include angle of the inclined plane LH 2 to shaft orientations.

[0032] By being hidden with ** P from the seal side field M along with an inclined plane LH 2 and inclined plane 3c, the rubber-like elasticity member 2 moves the resin member 3 and the rubber-like elasticity member 4 to a position (the direction of an annular clearance by the side of the atmospheric-air side field O), makes close the resin member 3 and the rubber-like elasticity member 4, and is making the rubber-like elasticity member 4 close to the close side A and the side-attachment-wall side B.

[0033] In order to move the resin member 3 and the rubber-like elasticity member 4 in the direction of an annular clearance, it is desirable to set up an inclined plane LH 2 and inclined plane 3c, and it may be theta1=30 degree and theta2=15 degree with the gestalt of this operation so that the sum of theta1 and theta2 may become 45 degrees.

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[0034] The rubber-like elasticity member 4 can be uniformly [abbreviation] close to the close side A and the side-attachment-wall side B by this, and good sealing ability can be obtained. Moreover, since the include angle of inclined plane 3c can be made small and the thickness of the resin member 3 can be secured by establishing an inclined plane LH 2 in a slot LH 1, it becomes possible to aim at improvement in permeability [gas]-proof. It is effective when the dimension of the shaft orientations of a slot LH 1 is small especially.

[0035] The resin member 3 was close to the rubber-like elasticity member 4, and has forced the rubber-like elasticity member 4 in the direction of the close side A and the side-attachment-wall side B while it forces the close side A and the side-attachment-wall side B in the close sections 3a and 3b, when pressed by the rubber-like elasticity member 2.

[0036] The rubber-like elasticity member 4 is forced on the close side A and the side-attachment-wall side B when pressed by the resin member 3.

[0037] In an initial state, since crushing is given, the rubber-like elasticity member 2 is regularly close to the close side A and the groove bottom side C as clearance zero, and seals an annular clearance.

[0038] Gas transparency is produced when a pressure differential is in the both sides of the sealing device used as the film, and when a pressure differential is almost zero, since gas transparency can be disregarded, this is attained by the rubber-like elasticity member 2 that what is necessary is just to stop clearance leakage.

[0039] However, when there is a pressure differential, gas may penetrate the rubber-like elasticity member 2, and the gestalt of this operation makes a self seal discover in the combination of the rubber-like elasticity member 2, the resin member 3, and the rubber-like elasticity member 4 according to the application-of-pressure condition from the seal side field M in such a case.

[0040] That is, the gas which penetrated the rubber-like elasticity member 2 can intercept transparency by the resin member 3. And since there is elasticity in the resin member 3 slightly, it becomes possible by forcing the close side A and the side-attachment-wall side B in the close sections 3a and 3b to suppress clearance leakage as much as possible. The resin member 3 might cause clearance leakage, and in that case, when the rubber-like elasticity member 4 is carrying out elastic contact to the close side A and the side-attachment-wall side B, it has still sealed the annular clearance certainly.

[0041] In addition to it, the rubber-like elasticity member 4 is made into the configuration which stops the amount of gas transparency with the gestalt of this operation.

[0042] Here, the amount of transparency of gas is [amount of transparency Q] =[transmission coefficient Kp] x[touch-area [with gas] S] x [pressure-differential P] x[time amount t] / [thickness h].

what is come out of and expressed -- it is -- therefore, "S -- small -- and h -- large -- " -- the amount Q of transparency can be stopped by carrying out.

[0043] This can stop the amount of gas transparency by making the configuration of the rubber-like elasticity member 4 into a configuration to which it is small and transparency distance (h) becomes large about the cross section (S) to the transparency path of gas, as shown in drawing 2 (b).

[0044] In addition, the rubber-like elasticity member 2, the resin member 3, and the rubber-like elasticity member 4 may be unified and formed, and may be combined and used.

[0045]

[Effect of the Invention] according to [as explained above] this invention -- said 1st rubber-like elasticity member -- an annular clearance -- steady -- it can seal -- this -- to the gas which penetrates the 1st rubber-like elasticity member, it can seal by said resin member, and it becomes still more possible to close the clearance leakage of this resin member by said 2nd rubber-like elasticity member. the time of application of pressure -- this -- the 2nd rubber-like elasticity member -- this -- since it is close to said side-attachment-wall side and the field of said another side through this resin member with the 1st rubber-like elasticity member, sealing ability can be raised.

[0046] Moreover, since said 2nd rubber-like elasticity member can take the configuration which

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is small in the cross section and enlarges distance of a transparency path to the transparency path which gas penetrates, it can stop the amount of transparency of gas.

[0047] Moreover, since said resin member is equipped with the close section close to said side-attachment-wall side and the field of said another side, respectively, it becomes possible [suppressing the clearance leakage from this resin member as much as possible].

[0048] Moreover, by being arranged in the inclined plane established in said groove bottom section, said 1st rubber-like elasticity member can hold the thickness of said resin member, and can press this resin member and said 2nd rubber-like elasticity member in the direction of said side-attachment-wall side and the field of said another side.

[0049] Therefore, it becomes possible to offer the sealing device which enables seal of penetrable high gas good over a long period of time.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing and this drawing (b) explaining the sealing device which drawing 1 (a) requires for the gestalt of operation are drawing explaining the condition of demonstrating the seal function.

[Drawing 2] The outline sectional view of the sealing device which drawing 2 (a) requires for the gestalt of operation, and this drawing (b) are mimetic diagrams showing the condition that gas penetrates a rubber-like elasticity member.

[Description of Notations]

- 1 Sealing Device
- 2 Four Rubber-like elasticity member
- 3 Resin Member
- 3a, 3b Close section
- 3c, LH2 Inclined plane
- 4a Cylindrical section
- 4b The direction section of a path

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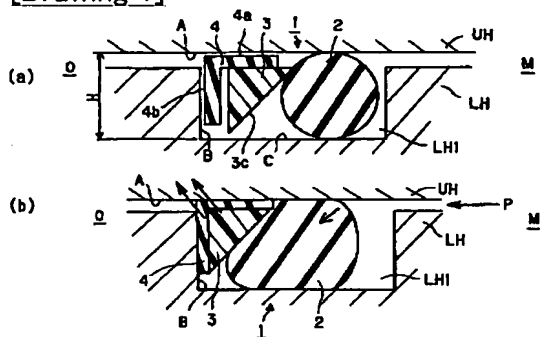
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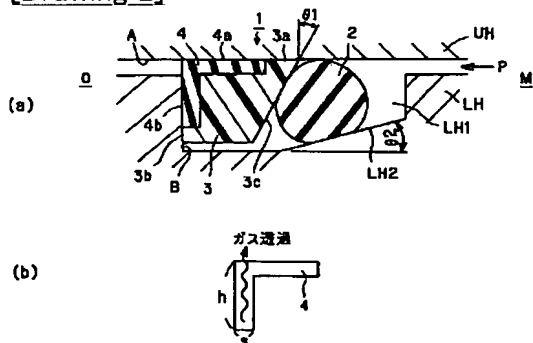
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DRAWINGS

[Drawing 1]



[Drawing 2]



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